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ABSTRACT

The Incentives for Improvement Program is an alternative student evaluation and recognition system that is responsive (all students have a realistic chance to achieve success) and challenging (students are not likely to succeed consistently unless they work up to their potential). The program's goals are to raise student performance and foster students' motivation to learn. An evaluation was conducted to determine whether the program accomplished its goals during its first year of implementation. Volunteer teachers from four Baltimore City (Maryland) middle schools participated in the program during the 1989-90 school year. The program's effectiveness in raising students' grades, probability of passing, intrinsic interest in their schoolwork, effort, and self-concept of ability was evaluated by comparing end-of-school-year outcomes for students in participating classes with those of similar students who were enrolled in the same courses at four other Baltimore City middle schools. To make these comparisons as precise as possible, pre-test adjusted outcome measures in hierarchical linear models were used. The results illustrate the substantial positive impact of individualized, improvement-oriented reward and recognition structures on students' grades in participating courses and on their probability of passing these courses. There was also a small positive effect of the program on students' self-reported levels of effort. The program provides an evaluative process in which educationally disadvantaged students share increased opportunities to experience success in a challenging curriculum by earning recognition for academic improvement and by building upon this improvement to earn better grades and higher passing rates. Teachers' expectations that students will succeed academically are a vital part of motivating and effectively teaching currently low-achieving students. Included are 25 references, 3 tables, 4 figures, and an appendix providing selected questionnaire items used to measure students' perceptions. (Author/RLC)

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Motivating Disadvantaged Early Adolescents To Reach New Heights: Effective Evaluation, Reward, and Recognition Structures

Douglas J. Mac Iver

Report No. 32

June 1992

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The Center

The mission of the Center for Research on Effective Schooling for Disadvantaged Students (CDS) is to significantly improve the education of disadvantaged students at each level of schooling through new knowledge and practices produced by thorough scientific study and evaluation. The Center conducts its research in four program areas: The Early and Elementary Education Program, The Middle Grades and High Schools Program, the Language Minority Program, and the School, Family, and Community Connections Program.

The Early and Elementary Education Program

This program is working to develop, evaluate, and disseminate instructional programs capable of bringing disadvantaged students to high levels of achievement, particularly in the fundamental areas of reading, writing, and mathematics. The goal is to expand the range of effective alternatives which schools may use under Chapter 1 and other compensatory education funding and to study issues of direct relevance to federal, state, and local policy on education of disadvantaged students.

The Middle Grades and High Schools Program

This program is conducting research syntheses, survey analyses, and field studies in middle and high schools. The three types of projects move from basic research to useful practice. Syntheses compile and analyze existing knowledge about effective education of disadvantaged students. Survey analyses identify and describe current programs, practices, and trends in middle and high schools, and allow studies of their effects. Field studies are conducted in collaboration with school staffs to develop and evaluate effective programs and practices.

The Language Minority Program

This program represents a collaborative effort. The University of California at Santa Barbara is focusing on the education of Mexican-American students in California and Texas; studies of dropout among children of recent immigrants are being conducted in San Diego and Miami by Johns Hopkins, and evaluations of learning strategies in schools serving Navajo Indians are being conducted by the University of Northern Arizona. The goal of the program is to identify, develop, and evaluate effective programs for disadvantaged Hispanic, American Indian, Southeast Asian, and other language minority children.

The School, Family, and Community Connections Program

This program is focusing on the key connections between schools and families and between schools and communities to build better educational programs for disadvantaged children and youth. Initial work is seeking to provide a research base concerning the most effective ways for schools to interact with and assist parents of disadvantaged students and interact with the community to produce effective community involvement.

Abstract

The Incentives for Improvement Program is an alternative student evaluation and recognition system that is both responsive (all students have a realistic chance to achieve success) and challenging (none are likely to succeed consistently unless they work up to their potential). The program's goals are to raise student performance and to foster students' motivation to learn. An evaluation study was conducted to determine whether the program had accomplished these goals during its first year of implementation. Volunteer teachers from four Baltimore City middle schools participated in the program during the 1989-90 school year. The program's effectiveness in raising students' grades, probability of passing, intrinsic interest in their schoolwork, effort, and self-concept of ability was evaluated by comparing end-of-school-year outcomes for students in participating classes with those of similar students who were enrolled in the same courses at four other Baltimore City middle schools. To make these comparisons as precise as possible, pre-test adjusted outcome measures in hierarchical linear models were used. The results indicate that the program had substantial positive effects on students' grades in participating courses and on their probability of passing these courses. There was also a small positive effect of the program on students' self-reported levels of effort.

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Introduction

Teachers provide students with feedback on their performance by assigning grades and making comments on students' quizzes, tests, and major assignments. They often give special recognition or awards to students who do well. Although feedback, evaluation, and recognition practices are supposed to help motivate students to reach higher standards of intellectual achievement, teacher reports concerning the proportion of students who are not performing up to potential suggest that typical current practices are not very effective.

There have been decades of research on student and worker motivation. The principles of goal-setting theory derived from this research suggest specific, practical alterations that teachers can make to their feedback, evaluation, and recognition practices that will make them more effective in motivating students to work hard at learning activities.

Volunteer teachers from four Baltimore City middle schools agreed to make these alterations by implementing the Incentives for Improvement Program -- a system in which feedback and recognition is based upon evaluating students in reference to specific improvement goals; individualized, short-range performance benchmarks that are challenging but reachable. This paper evaluates the effectiveness of this program in its first year of implementation.

One basic premise of goal-setting theory is that task performance is heavily influenced by the conscious goals that individuals are trying to accomplish on the task (Locke & Latham, 1984). Specific challenging goals (e.g. "beat your highest previous score") lead to better performance than specific easy or vague goals (e.g., "do your best") or no goals (Locke &Latham, 1990b). But, in order for goals to lead to better performance, students must be consciously trying to attain those goals (Erez & Zidon, 1984) and must receive feedback which allows them to judge whether they are attaining the goal (Becker, 1978; Strang, Lawrence, & Fowler, 1978).

Goal commitment is highest when goals are perceived as reachable rather than impossible and when there are clear payoffs (intrinsic or extrinsic) associated with attaining the goal (Locke, Latham, & Erez, 1988). Also, assigned goals that represent an appropriate level of challenge typically produce the same level of goal commitment and performance as participatively-set or self-selected goals (Latham & Lee, 1986; Locke & Latham, 1990a).

Traditional feedback, grading, and recognition practices in schools are based on evaluation systems that compare students' performance to that of other students or to desirable absolute standards of achievement. The implicit goal assigned to students in both types of systems is to attain desirable grades and the recognitions such as honor roll membership that go along with such grades.

Academically disadvantaged students -- who by the middle school years are significantly behind more advantaged classmates in academic skills -- may find it impossible to attain this implicit goal even if they work very hard. Even dramatic progress can still leave disadvantaged students near the bottom of their class in comparative terms and far from the absolute levels of performance that are rewarded and recognized in their school. Once students begin to realize that their best efforts will go unrecognized and unrewarded, they become frustrated with and disengaged from school (Natriello, 1982), and their goal commitment, level of effort, and rate of progress drop precipitously.

One reason traditional evaluation practices are ineffective is that they include neither specific improvement goals nor regular improvement-focused feedback to make students accountable for making consistent, gradual progress toward high levels of achievement and understanding. Traditional practices do

not explicitly encourage all students (regardless of current class standing and achievement level) to try to raise their performance levels by specific amounts in specific time periods.

In the Incentives for Improvement Program, students are assigned specific, short-range, individualized goals. The goals are specific because such goals are better motivators than general goals, largely because progress toward a specific goal is easier for students to detect. Similarly, the goals are close at hand (e.g., "to score 10 points higher on the next quiz") because such goals are more motivating than distant goals (e.g., "to someday become an 'A' student.") Finally, the goals are individualized, because a specific goal that is challenging but doable for one student may be unreachable (at least, in the short-run) for another student and may be too easy for still another student.

Program Components

The Incentives for Improvement Program consists of three major components: (a) for each quiz or test, students are given an individualized, specific goal at which to aim; as students improve, their individualized goals are gradually raised; (b) "improvement points" are used in scoring quizzes and tests (these points provide students with clear feedback concerning their success at accomplishing the individualized goals), and (c) all students who raise their performance level receive official recognition through various types of improvement awards.

The Incentives for Improvement Program features three-quiz "rounds." At the start of each round, each student receives his or her "base score" for that round. This base score represents the student's average percent correct on recent quizzes and provides a starting point for improvement. Students are asked to try to beat this score on the next three quizzes. After each quiz, each student's quiz score is compared to his or her base score and students earn 0, 10, 20 or 30 improvement points on the quiz, depending on by how much they were able to beat their base score.

Before introducing the program to students, teachers give two or more quizzes, then determine an initial base score for each student by averaging his or her scores on those quizzes. Then, on the next three quizzes, students are able to earn improvement points as shown below:

Quiz Score	Improvement Pts.
5 or more points below base score	0
4 points below to 4 points above base score	10
5 points to 9 points above base score	20
More than 9 points above base score	30
95% - 99% (if students' base score is above 90%)	20
100%	30

Thus, improvement points are given in relationship to past performance. A student whose base score (average percent correct on recent quizzes) is 65 and who gets a 70 earns the same number of improvement points (20) as a student whose base score is 75 and who gets an 80. In order to earn the maximum number of improvement points, a student must beat his or her base score by more than 9 points. However, there is no danger of students "topping out" with too high a base score; students who have a base score over 90% receive 20 improvement points when they score 95-99%, and receive 30 improvement points if they get a perfect paper. Figure 1 shows how improvement points would be computed for one fictitious set of students.

Insert Figure 1

Figuring Average Improvement Points and New Base Scores

At the end of each round of three quizzes, each student's average improvement points for the round is computed (See Figure 2). Each student's new Base score is then figured by averaging the student's percent correct on the last three quizzes with the current base score.

Insert Figure 2

End-of-Round Awards. Students receive awards at the end of every round. When the program began, two types of awards were offered ("Rising Star" and "Milestone" Awards). Late in Year 1, a few of the participating teachers began offering a third type of award ("90% Club Awards"). Use of this award spread to all schools in Year 2. Also, at the beginning of Year 2, Milestone awards were replaced by "Personal Best" awards.

Rising Star Awards. A Rising Star Award is given to each student who averages at least 20 improvement points on the three quizzes in a round. Figure 2 shows the performance of 15 fictitious students during Round 1. Nine of these students earn a Rising Star Award for Round 1 because their improvement point average (as listed in the final column of the quiz score sheet) is 20 or greater.

Milestone and Personal Best Awards. Teachers keep a record of students' base scores throughout the year (see Figure 3). In Year 1, students received a Milestone Award whenever they raised their base score 5 points beyond their initial base score (e.g., a student whose initial base score was 65 received a certificate of recognition if he or she reached a base of 70, received a different certificate later for reaching a base of 75, and so on.

Insert Figure 3

In the current program, whenever a student reaches a base score that represents a new high for him or her -- even if it is only **one point** higher -- the student receives a "Personal Best" award for breaking his or her past "personal record."

90% Club Awards. At the end of every round, "90% Club" awards are also now given to every student whose new base score at the end of the round is 90% or above.

In summary, at the end of every three quizzes, students have the opportunity to earn three awards. They receive Rising Star awards for averaging at least 20 improvement points on the last three quizzes, they receive Personal Best awards for setting personal "base score" records, and they receive 90% Club awards for reaching and maintaining a performance level of 90% or better.

Description of the Evaluation Study

The purpose of the evaluation study was to determine whether the Incentives for Improvement Program accomplished its two goals: to raise student performance and to foster students' motivation to learn. A matched control group, pre-test-posttest design (Fitz-Gibbon & Morris, 1987) was used to evaluate the program's effectiveness in reaching these goals.

Volunteer teachers from four Baltimore City middle schools participated in the program during the 1989-1990 school year. When registering a class for the program, teachers were asked to describe the title of the course, and the ability levels and grade levels of the students. This information was used to match participating classes with control group classes drawn from four nonparticipating middle schools. The nonparticipating schools were selected because they had student populations that were similar to those in the participating schools, according to principals' reports.

Measures

Intrinsic Value of the Subject Matter, Effort, and Self-Concept of Ability. Students in each of the participating and control classes answered questionnaire items that focused on their perceptions of intrinsic value (e.g., "How excited are you to learn about this subject matter?"), effort (e.g., "How hard are you working to learn about this subject?"), and self-concept of ability (e.g., "How good are you in this subject?"). Items had a response scale (ranging from 1 to 7 unless otherwise noted) with verbal anchors at each end of the scale (see Appendix).

Each construct was measured using multiple indicators taken from the Motivation to Learn Scale (Mac Iver, Stipek, & Daniels, 1991). A student's responses to multiple indicators of the same construct were averaged to create a composite score for that construct. These measures were collected twice in 22 matched pairs of classes; once shortly after the participating class was enrolled in the program, and once near the end of the fourth quarter of the school year (around mid-May).

Past and Current Performance. Information regarding students' grades from the year prior to the intervention was available only for seventh- and eighth-grade students (20 matched pairs of classes). For these students, a "general average" grade across all classes and all reporting periods from the pre-intervention year was computed and used as a pre-test measure. Each student's performance in a participating class (or in a matched control group class) was measured by the student's final grade in that class.

Implementation Measures

On the post-test questionnaire, students in participating classes were asked to indicate how often their teacher had used the improvement-points method for scoring quizzes and tests and also how often the teacher had given out improvement awards:

> This year, some teachers at this school awarded improvement points to students on their quizzes, tests, or assignments. Students could win 10, 20, or 30 improvement points depending on how much they were able to beat their "base score." **How often did the teacher give improvement points on quizzes and tests in this class?**
>
> Never _____ Very Often
> 1 2 3 4 5

> How often did the teacher give out special improvement awards (such as certificates, buttons, pencils, or bumper stickers) to students who were showing good progress?
>
> Never _____ Very Often
> 1 2 3 4 5

For both items, the mean response of the students in each class was computed. In classes where the mean response to both items was 3.5 or higher, teachers were judged to have successfully met the implementation standards for Year 1. These standards were met by 71% of the participating classes; the data analyses reported here focus just on these classes. Similar (but somewhat weaker) effects are found in analyses that include all participating classes.

Results

Analysis Plan. The conventional way of evaluating program effects on continuous outcome variables after controlling for differences in pretest status is to conduct an ANCOVA at the student level, thus ignoring the fact that students are nested within classrooms.

The recent development of hierarchical linear modeling(HLM) techniques makes it possible to estimate an ANCOVA-like model without erroneously assuming independent responses within classes (Bryk & Raudenbush, 1992). This type of HLM model (a random-intercept model with student-level covariates) takes into account the dependence among responses within classrooms and provides efficient estimates of program effects in unbalanced, nested designs. For analyses with continuous dependent variables, we used random intercept models with covariates to test for program effects.

One of our dependent variables--whether or not the student received a passing final grade--was a dichotomous, qualitative measure. Program effects on this variable were evaluated using logistic regression.

Effects of the Incentives for Improvement Program on Students' Report Card Grades. Report cards in Baltimore middle schools contain number grades rather than letter grades. Grades ranging from 90-100 are labeled "excellent," grades between 80-89 are labeled "good," grades between 70-79 are labeled "satisfactory," and grades under 70 signify "failure."

Pretest grades. The first panel in Table 1 shows the general average (i.e., average grade across all courses and all reporting periods) that students obtained on their report cards in the year prior to the beginning of the Incentives for Improvement Program. The average grades obtained by both experimental and control group subjects were in the satisfactory range. Experimental group students had nonsignificantly lower general averages than did comparison group subjects in the year prior to the intervention.

Post-test grades. The second panel in Table 1 shows the unadjusted fourth-quarter grades obtained by students in the target courses at the end of the pilot year of the Incentives for Improvement Program. Students in the Incentives for Improvement program achieved significantly higher fourth-quarter grades in target courses than did comparison group students (random intercept model with no covariates, $y = 5.1$, p [one tail] $\leq .025$, ES = +.53.)

However, this comparison between unadjusted fourth-quarter grades does not take into account each student's own prior general average. A more precise comparison can be made using an adjusted fourth-quarter grade for each child which indicates how much better or (worse) that child did (in the fourth quarter of the target course) than predicted based on his or her general average from the previous year. The average (adjusted) fourth-quarter grade is six points higher for experimental than for control students (random intercept model with one covariate, $y = 6.4$, p [one tail] $\leq .005$, ES = +.66). The Incentives for Improvement Program is having a substantial positive impact on students' level of performance in participating courses; students in participating classes earn adjusted final grades that are almost two-thirds of a standard deviation

higher than students in matched non-participating classes.

Insert Table 1

Probability of Passing. By increasing student effort and improving performance, the Incentives for Improvement Program should increase the proportion of students who receive a passing grade. To test the effect of the program on students' probability of passing, logistic regression analyses were used to estimate the difference in probability of passing in experimental versus control classrooms after controlling for student's general average grade from the previous year. The Incentives for Improvement program had a significant positive effect on students' probability of passing, $B = .72$, p [one tail] $\leq .01$. Figure 4 shows the predicted probability of passing for students who had different levels of past performance. Note that the Incentives for Improvement program especially benefited students who were most at risk (those with low general averages from the previous year); 12% more of these students passed in experimental than in control classes.

Insert Figure 4

Effects of the Incentives for Improvement Program on Students' Self-Reported Effort, Intrinsic Valuing of the Subject Matter, and Self-Concept of Ability. In the Incentives for Improvement Program, students are assigned specific challenging goals and earn awards for attaining them. According to goal-setting theory (Locke & Latham, 1990a), these goals and incentives should lead students to work and study harder than students in nonparticipating classes. Panel 1 of Table 2 indicates that, holding pre-intervention effort constant, students in participating classes reported expending more effort (studying harder for quizzes and tests, working closer to their potential, etc.) than did students in control classes.[1]

Insert Table 2

The Incentives for Improvement Program uses modest extrinsic rewards to recognize students for specific accomplishments. Convergent evidence from several studies (e.g., Deci, 1975; Kruglanski, Friedman, & Zevi, 1971; Lepper, Greene, & Nisbett, 1973) indicates that the inappropriate use of extrinsic rewards can have detrimental effects on students' intrinsic motivation. But, as Lepper and Hodell (1989, p. 78) have argued, when rewards are given based on task performance and convey to children clear positive information about their increasing competence at an activity, the rewards are unlikely to undermine intrinsic interest.

In fact, given the relatively low interest value of many school tasks, the recognition and reward structures in the Incentives for Improvement Program could even enhance students' interest and enthusiasm because these structures ensure that every student is provided with an appropriate level of challenge. Throughout the year, each student in the program is asked to shoot for personalized goals that are neither trivially simple nor impossibly hard. The challenge of meeting such goals can be highly intrinsically motivating (Csikszentmihalyi & Nakamura,1989; Lepper & Hodell, 1989).

Panel 2 of Table 2 indicates that the Incentives for Improvement Program had a marginally significant positive effect (of almost one-fifth of a standard deviation) on students' perceptions of the intrinsic value of the subject matter.

It is well-established that when individuals succeed in attaining specific goals their ability

[1] Adolescents' ability perceptions have a strong impact on their effort and intrinsic valuing of the subject matter in junior and senior high school courses (Mac Iver, Stipek & Daniels, 1991). Therefore, program effects on efforts and intrinsic valuing of the subject matter were evaluated after controlling for students' pre-intervention ability perceptions.

perceptions are increased (e.g., Bandura 1986; Earley, 1986; Locke, Frederick, Lee, & Bobko, 1984; Mossholder, 1980). On the other hand, individuals with specific goals who do not reach those goals may develop ability perceptions that are less than or equal to those of lower-performing individuals with vague goals because the latter tend to give themselves the benefit of the doubt when evaluating their performance (Mossholder, 1980).

Thus, it was unclear whether program participants, who over time typically experience both some success and some failure in meeting the specific improvement goals, would develop higher ability perceptions than control group participants who may have only vague goals for their performance. Panel 3 of Table 2 shows that the program had a positive but marginally significant impact on students' ability perceptions.

Discussion

The results of this study show the substantial impact of individualized, improvement-oriented reward and recognition structures on students' grades, and thus on their probability of passing. The program's effectiveness is probably due to a number of factors. All students have a realistic chance of beating their individualized base scores with effort. Even small improvements do not go unrecognized. In addition, by giving students a proximal, concrete goal to strive for on every quiz, the program may motivate more students to perform up to their potential on these quizzes, with beneficial effects on their grades.

Finally, because teachers closely monitor student progress in a regular and systematic way, they become aware of the accomplishments of low-performing students. Teachers now see the small but significant gains that these students are making, and may be more likely than before to pass these students.

Consistent with the predictions of goal-setting theory, there was a significant but modest positive impact of the program on students' self-reported effort. The challenging but reachable goals assigned to students in the program apparently motivate students to increase the duration and intensity of their learning efforts.

Our findings show that the Incentives for Improvement program, in its pilot year, is accomplishing two major objectives in seeking to improve the academic performance of educationally disadvantaged students.

First, it is providing an evaluative process in which educationally disadvantaged students share increased opportunities to experience genuine success in a challenging curriculum by earning recognition for academic improvement and by building upon this improvement to earn better grades and higher passing rates. The current press for the institution of higher and even "world-class" standards in our schools will be counterproductive if it increases the likelihood that the best efforts of educationally disadvantaged students will go unrecognized and unrewarded just because these students are starting out so far behind. On the other hand, if the establishment of higher standards is accompanied by the adoption of evaluation and recognition structures that provide students with specific improvement goals and regular improvement-focused feedback and recognition, then educationally disadvantaged students may have the impetus and support they need to actually reach these higher standards over time. The Incentives for Improvement program is a step in this direction.

Second, teachers' expectations that students will succeed academically -- that all students can learn -- are a vital part of motivating and effectively teaching currently low-achieving students. Teachers are constantly advised that they must have high expectations for all students and must offer all students a high-content curriculum. Unfortunately, when

teachers take this advice, current evaluation practices in schools almost pre-ordain the failure of students who start out far behind in their learning. These failures reinforce teacher expectations that educationally-disadvantaged students are incapable of mastering advanced-level knowledge and increases the pressure on teachers to return to a watered-down curriculum.

The Incentives for Improvement program changes this picture dramatically by giving educationally-disadvantaged students a genuine opportunity for success in a high-content curriculum and by providing teachers with direct evidence weekly in their own classrooms that their low-achieving students can indeed improve their academic performance. Thus, teachers' expectations that all students can learn, in the Incentives for Improvement classroom, are reinforced and increased by concrete evidence of academic improvement.

A Helpful Innovation or a "Bad Idea Whose Time Has Come?" Finn (1991, pp. 109-111, 222-224) has called the practice of giving low-achieving children "positive reinforcement and favorable feedback in the form of encouraging teacher comments, upbeat report cards" and so on, "a bad idea whose time has come." He sees this practice as partly responsible for parents' and youngsters' complacency and for their tendency to overrate the youngsters' accomplishments. Finn blames colleges of education and education research institutes for promoting the use of undemanding standards by encouraging the use of evaluation systems that put success within the reach of all students..

When calls to implement a more responsive evaluation system are misunderstood as calls to avoid giving students any negative feedback, these calls are indeed counterproductive. Any evaluation system that rewards low-achieving students regardless of whether they are showing progress deserves to be criticized as something that is more damaging than helpful. On the other hand, it is a grave mistake "to blacken with the same brush" rigorous progress-oriented evaluation systems such as the Incentives with Improvement program. In these systems, success and its rewards are indeed accessible to all students, but only if all students work harder and smarter and thus raise their level of performance.

In the Incentives for Improvement program, students receive realistic information concerning their current level of performance frequently, including clear negative feedback when they fail to reach their assigned improvement goals. Decades of research on student and worker motivation make it clear that it is possible, indeed essential, to implement such evaluation systems that are both responsive (every individual has a realistic chance to achieve success) and challenging (none are likely to succeed unless they work up to their potential).

A recent trend in educational assessment is to replace traditional quizzes and tests with "authentic assessments" or "true tests" that ask students to demonstrate their mastery while showing "that they can produce something of value to themselves and others -- an argument, a report, a plan, an answer or solution; a story, a poem, a drawing, a sculpture, or a performance; that they can conduct an experiment or deliver a persuasive oral presentation" (California Assessment Program, not dated). Does the Incentives for Improvement program require teachers to continue using traditional quizzes and tests? By no means. Several of the participating teachers used richer, more active and realistic types of assessments fairly often. In their feedback to students, these teachers gave each student -- in addition to their comments and ratings of the student's performance on specific dimensions (e.g. organization, content, creativity, handling of questions) -- a summary score (e.g., "summing across all dimensions graded, you received 80% of the total possible points"). These summary scores were used for computing improvement points, figuring new base scores, and determining awards.

One caveat is in order. As assessment tasks become more complex, increased achievement will be associated with increased effort and persistence only for individuals

who know effective task strategies (Locke & Latham, 1990). For example, an improvement-oriented evaluation system may prompt students to work hard on an "authentic" task, but this effort is unlikely to pay off unless students have also received effective instruction in how to approach such a task -- for example, direct instruction in helpful, domain-specific metacognitive and problem-solving strategies (Nickerson, 1988).

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INCENTIVES FOR IMPROVEMENT PROGRAM

Quiz Score Sheet: Teacher Rhodes Period 3rd

Student	Base Score No. 1 A	Date: 9/8 Quiz: The New World B	Improvement Points 1	Date: 9/15 Quiz: Settlement of America C	Improvement Points 2	Date: 9/22 Quiz: 13 Colonies D	Improvement Points 3	Base Score No. 2 (A + B + C + D)/4	Average Improvement Points
Ames, D.	60	55	0						
Bock, Q.	95	100	30						
Brigham, F.	70	80	30						
Brown, V.	60	65	20						
Chase, L.	55	55	10						
Coates, J.	65	70	20						
Flavell, K.	75	85	30						
Frize, J.	70	85	30						
Gibson, L.	90	95	20						
Ginsburg, A.	70	44	0						
Hackett, R.	50	60	30						
Omnisore, P.	85	72	0						
Truitt, J.	65	84	30						
Truesdale, K.	60	76	30						
Simmons, O.	60	48	0						20

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Figure 1. Improvement points earned by fictitious students on the first quiz in Round 1.

INCENTIVES FOR IMPROVEMENT PROGRAM

Quiz Score Sheet: Teacher Rhodes **Period** 3rd

Student	Base Score No. 1 A	Date: 9/8 Quiz: The New World B	1	Date: 9/15 Quiz: Settlement of America C	2	Date: 9/22 Quiz: Life in the 13 Colonies D	3	Base Score No. 2 (A + B + C + D)/4	Average Improvement Points
Ames, D.	60	55	0	65	20	70	30	63	17
Bock, Q.	95	100	30	95	20	90	0	95	17
Brigham, F.	70	80	30	75	20	70	10	74	20
Brown, V.	60	65	20	70	30	60	10	64	20
Chase, L.	55	55	10	60	20	65	30	59	20
Coates, J.	65	70	20	60	0	70	20	66	13
Flavell, K.	75	85	30	80	20	80	20	80	23
Frize, J.	70	85	30	80	30	80	30	79	30
Gibson, L.	90	95	20	95	20	95	20	94	20
Ginsburg, A.	70	44	0	36	0	50	0	50	0
Hackett, R.	50	60	30	70	30	60	30	60	30
Omnisore, P.	85	72	0	80	0	88	10	81	3
Truitt, J.	65	84	30	86	30	78	30	78	30
Truesdale, K.	60	76	30	96	30	100	30	83	30
Simmons, O.	60	48	0	68	20	84	30	65	17

Figure 2. New base scores and average improvement points earned by students during Round 1.

Base Score Sheet: Teacher Rhodes Period 3rd

Student	Base Score 1	Base Score 2	Base Score 3	Base Score 4	Base Score 5	Base Score 6	Base Score 7	Base Score 8	Base Score 9	Base Score 10
Ames, D.	60	63	65							
Bock, Q.	95	95	96							
Brigham, F.	70	74	74							
Brown, V.	60	64	65							
Chase, L.	55	59	62							
Coates, J.	65	66	65							
Flavell, K.	75	80	79							
Frize, J.	70	79	80							
Gibson, L.	90	94	96							
Ginsburg, A.	70	50	70							
Hackett, R.	50	60	65							
Omnisore, P.	85	81	85							
Truitt, J.	65	78	96							
Truesdale, K.	60	83	74							
Simmons, D.	60	65	65							

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Figure 3. **Record of students' base scores up to the start of Round 3.**

Figure 4

Program Effects on Students' Probability of Passing

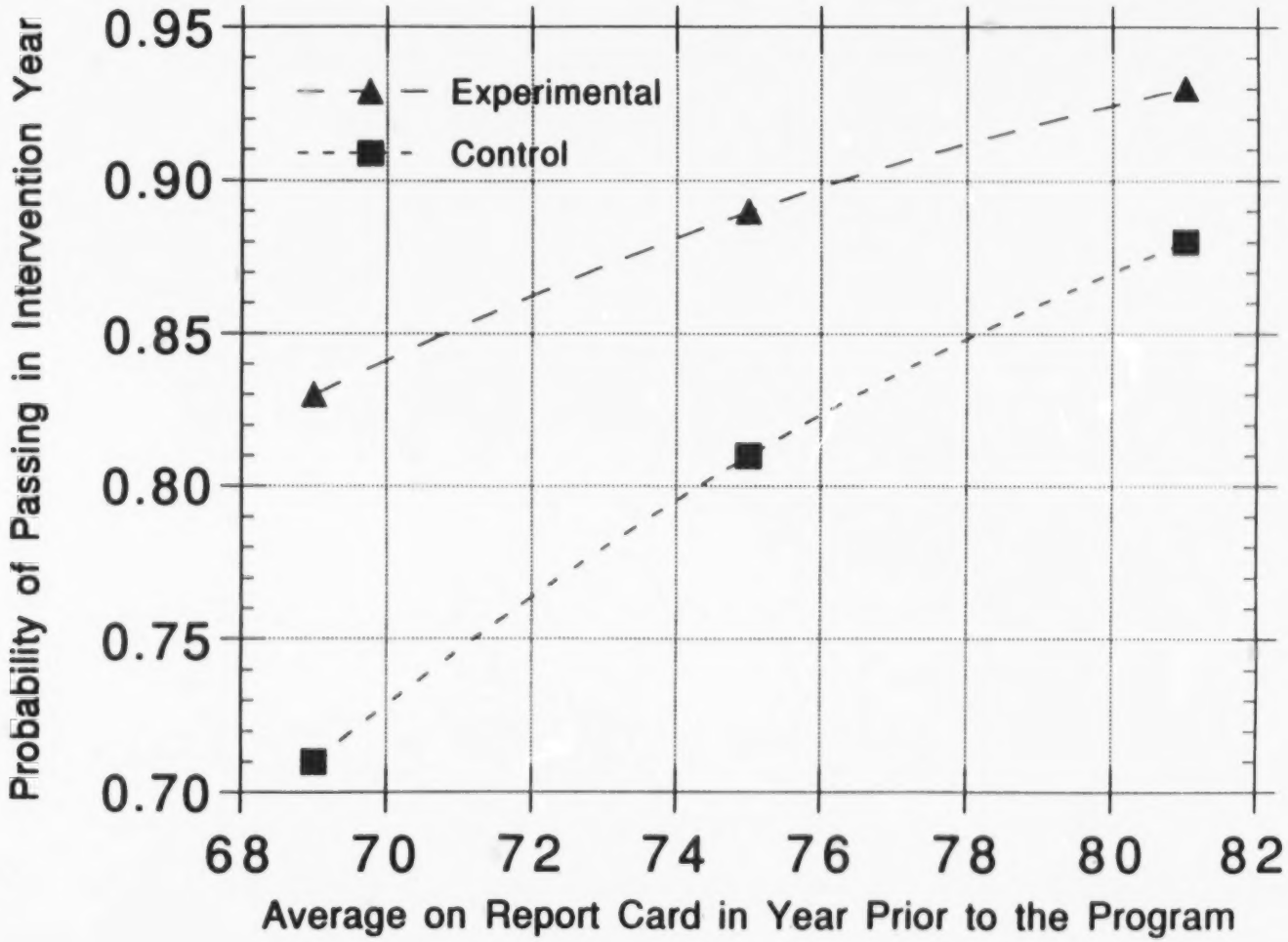

Table 1

Report Card Grades: Means, γ (HLM) Estimates of Program Effects, and Effect Sizes (N = 28 classes)

Panel 1:

Mean "General Average" on Report Card in Year Prior to the Intervention		γ (HLM)	Effect Size
Experimental 74	Control 76	-1.6	-.27

Panel 2:

Mean Unadjusted Final Grade in Intervention Year		γ (HLM)	Effect Size
Experimental 79	Control 74	+5.1***	+.53

Panel 3:

Mean Adjusted Final Grade in Intervention Year[a]		γ (HLM)	Effect Size
Experimental 78	Control 72	+6.4****	+.66

[a]Controlling for differences in students' general averages from the prior year.

*$p \leq .10$ **$p \leq .05$ ***$p \leq .025$ ****$p \leq .005$ (one-tailed tests)

Table 2

Students' Self-Reported Effort, Intrinsic Value of Subject Matter, and Self-Concept of Ability: Adjusted Means, γ (HLM) Estimates of Program Effects, and Effect Sizes (N = 32 classes)

Panel 1:

Adjusted Mean Fourth-Quarter Effort[a]		γ (HLM)	Effect Size
Experimental students	Control students		
5.51	5.28	.23**	+.20

Panel 2:

Adjusted Mean Fourth-Quarter Perceptions of the Intrinsic Value of the Subject Matter[b]		γ (HLM)	Effect Size
Experimental students	Control students		
5.31	5.06	.25*	+.18

Panel 3:

Adjusted Mean Fourth-Quarter Self-Concept of Ability[c]		γ (HLM)	Effect Size
Experimental students	Control students		
5.40	5.24	.16*	+.13

[a]Controlling for pre-test differences in effort and self-concept of ability.

[b]Controlling for pre-test differences in perceptions of intrinsic value and self-concept of ability.

[c]Controlling for pre-test differences in self-concept of ability.

*$p \leq .10$ **$p \leq .05$ (one-tailed tests)

Appendix

Questionnaire Items Used to Measure Students' Perceptions

Student's Perception of the Intrinsic Value of the Subject Matter

How excited are you to learn about this subject matter? (*not at all excited*)...(*very excited*)

How much do you enjoy learning about this subject? (*not much at all*)...(*very much*)

How much do you care about learning a lot about this subject? (*don't care at all*)...(*care very much*)

How much do you like working on the assignments in this class? (*not at all*)...(*very much*)

Do you do things for fun outside of class that are related to or have something to do with what you are learning about in this class? (*never*)...(*yes, a lot*)

Student's Self-Concept of Ability

How good are you in this subject? (*not good at all*)...(*very good*)

How good do you think you are in this subject compared to other students in the class? (*much worse than other students*)...(*much better than other students*)

How often do you feel smart in this class? (*never*)...(*very often*)

How much natural ability do you have in this subject? (*no ability at all*)...(*a lot of ability*)

Student's Effort

If a student works to his or her highest potential in a class, then we could say that he or she is putting forth 100% effort to learn the subject matter. How much effort do you usually put forth in this class? (*0% -- I am not trying at all*)...(*100% -- I am working to my highest potential*)

How hard are you working to learn about this subject? (*not hard at all*)...(*as hard as I can*)

How hard do you study for tests in this class? (*just enough to pass*)...(*whatever it takes to get a good grade*)

How hard do you work in this class? (*much less than most classes*)...(*much more than most classes*)